Name: _____ *Math 10F&PC Honours* **Date:** _____

Chapter 1 Measurement

1.1 Imperial Measures of Length

Chapter 1 Prerequisite Skills

1. Fill in the blanks.

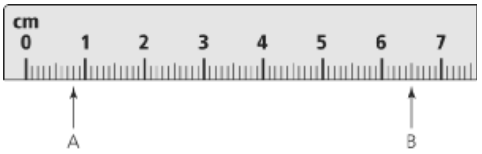
a) There are $100 = 10^2$ centimeters in 1 m.

b) There are $1000 = 10^3$ millimeters in 1 m.

c) There are 3500 (3.5×10^3) millimeters in 3.5 m.

d) There are 100000 (10^5) centimeters in 1 km.

2. The diagram shows an SI ruler.

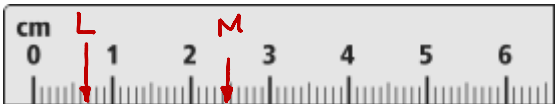


a) What is the length measured at A? 0.8 cm or 8 mm

b) What is the distance from A to B? B − A = 3.5 − 0.8 = 2.7 cm

c) What is the smallest unit you can read on this ruler? mm

3. Mark the position of each letter on the ruler.



a) L = 1.7 cm **b)** M = 2.5 cm **c)** N = 32.5 mm **d)** P = 55 mm

In Canada we use a system of measurement called the SI (international) system.
Some examples of units of measure in the metric system are:
However, many manufacturing sectors and businesses still use the Imperial
System of measurement. Some examples of units of measure in the imperial system are:

Imperial Unit	Abbreviation	Referent	Relationship between units
Inch	in. (3 in = 3″)	Thumb length	
Foot	ft. (3 ft 3′)	Foot length	1 ft. = 12 in.
Yard	yd.	0.5 Arm Span	1 yd. = 3 ft. Or 1 yd. = 36 in.
Mile	mi.	Distance walked in 20 minutes	1 mi. = 1760 yd. Or 1 mi. = 5280 ft.

Example 1: ***(a) Convert 5 yd. to:***

(i) Feet

$5\text{ yd} \times \frac{3\text{ ft}}{1\text{ yd}}$

$= 15\text{ ft}$

(ii) Inch

$5\text{ yd} \times \frac{36\text{ in}}{1\text{ yd}}$

180 in

(b) Convert 51 in to:

(i) Feet and Inches

(ii) Yards, Feet, and Inches

$51 \text{ in} = 4 \text{ ft } 3 \text{ in}$ $1 \text{ yd} = 3 \text{ ft}$

$= 1 \text{ yd}, 1 \text{ ft}, 3 \text{ in}$

Convert: (i) 100 in to yd

(ii) 2.5 mi to in

$1 \text{ yd} = 36 \text{ in}$

$100 \text{ in} \times \frac{1 \text{ yd}}{36 \text{ in}}$

$= \{2 \text{ yd}, 2 \text{ ft}, 4 \text{ in}\}$

$2.5 \text{ mi} = 2.5 \text{ mi} \times \frac{1760 \text{ yd}}{1 \text{ mi}} \times \frac{36 \text{ in}}{1 \text{ yd}}$

$= \{158400 \text{ in}\}$

Example 2: ***Anne is framing a picture. The perimeter of the framed picture will be 136 in.***

(a) What will be the perimeter of the framed picture in feet and inches?

Convert 136 in to ft . in

work $136 \text{ in} \times \frac{1 \text{ ft}}{12 \text{ in}} = 11.\overline{3}$

$\{11 \text{ ft} - 4 \text{ in}\}$

(b) The framing material is sold by the foot. It costs \$1.89/ft. What will be the cost of material before taxes?

$\text{Cost} = 12 \text{ ft} \times \$1.89/\text{ft}$

$= \$22.68$

Example 3: ***Nancy has 7 yd. of material. She wants to make curtains that are 18 in. wide. How many curtains can Nancy make?***

Convert 7 yd to in $\quad 7 \text{ yd} \times \frac{36 \text{ in}}{1 \text{ yd}} = 252 \text{ in}$

$\therefore$ # of curtains $= \frac{252 \text{ in}}{18 \text{ in}} = \{14 \text{ curtains}\}$

Example 4: ***A map of British Columbia has a scale of 1:1 723 000. The distance on the map between Prince George and Cache Creek is*** $8\frac{11}{16}$ ***in. What is this distance to the*** ~~***nearest***~~ ***mile?*** yd & in

236 mi.

scale 1 : 1 723 000

actual d in in $= 8\frac{11}{16} \times 1\,723\,000$

$= 14968562.5 \text{ in}$

$\{236 \text{ mi} \cdot 433 \text{ yd} \cdot 1 \text{ ft} \cdot 2.5 \text{ in}\}$

$1 \text{ mi} = 63360 \text{ in}$ $\quad 14968562.5 \text{ in} \times \frac{1 \text{ mi}}{63360 \text{ in}} = 236.2462516$

$0.2462516 \text{ mi} \times \frac{1760 \text{ yd}}{1 \text{ mi}} = 433.4027 \text{ yd}$ $\quad 236 \text{ mi} \cdot 440 \text{ yd} \cdot$

$0.4027 \text{ yd} \times \frac{3 \text{ ft}}{1 \text{ yd}} = 1.2081 \text{ ft}$

Theorem (Perfect Squares Identity) For all real numbers a,b, there hold the identities

$$(a+b)^2 = a^2+2ab+b^2 \quad \text{and} \quad (a-b)^2 = a^2-2ab+b^2.$$

Theorem (Difference and Sum of Cubes) For all real numbers a,b, there holds the identity

$$a^3-b^3 = (a-b)(a^2+ab+b^2) \text{ and } a^3+b^3 = (a+b)(a^2-ab+b^2).$$

Challenging question: The sum of two numbers is 7 and their product is 3. Find the sum of their squares and the sum of their cubes.

Assignment: page 11 Q. #3, 6–9, 11–14,16–18